Proposed

AMENDMENTS TO THE CLAIMS:

1. (Currently Amended) A method of determining the oil fraction of a fluid emulsion comprising heavy oil/**bitumen** and water **by direct measurement** comprising the steps of:

   (a) providing a low field NMR relaxometer;

   (b) measuring and recording the T_2 relaxation spectrum of the emulsion at a temperature allowing recovery of the T_2 spectrum of the heavy oil/**bitumen, substantially separate from a T_2 water peak**;

   (c) determining a **distinguishing** T_2 cutoff value;

   (d) measuring the total amplitude **(A_{oil})** of the spectrum at T_2 times less than and equal to the T_2 cutoff value ~~(A_{oil})~~; ~~and~~

   (e) converting A_{oil} to a weight value by dividing A_{oil} by the amplitude index of an oil standard **(AI_{oil})** of known weight ~~(AI_{oil})~~; **and**

   (f) using the weight value to determine the oil fraction of the fluid emulsion.

2. (Original) The method of claim 1 wherein the temperature is about 30°C and the T_2 cutoff value is about 10 milliseconds.

3. (Currently Amended) A method of determining the water fraction of a fluid emulsion comprising heavy oil/**bitumen** and water **by direct measurement** comprising the steps of:

   (a) providing a low field NMR relaxometer;

   (b) measuring and recording the T_2 relaxation spectrum of the emulsion;

   (c) determining a **distinguishing** T_2 cutoff value;

   (d) measuring the total amplitude **(A_w)** of the spectrum at T_2 times greater than the T_2 cutoff value ~~(A_w)~~; ~~and~~

(e) converting A_w to a weight value by dividing A_w by the amplitude index of a water standard **(AI_w).** of known weight ~~(AI_w).~~**; and**

(f) using the weight value to determine the water fraction.

4. (Previously Amended) The method of claim 3 further comprising the steps of determining the total weight of the sample and determining the oil fraction of the emulsion by subtracting the water fraction of the sample from the total weight of the sample.

5. (Currently Amended) An apparatus ~~for~~ determining **by direct measurement** the oil fraction of a flowing fluid emulsion comprising heavy oil**/bitumen** and water comprising:

(a) a low field NMR relaxometer having a NMR magnet positioned in proximity to a channel through which the emulsion flows, said relaxometer for measuring the T_2 spectrum of a ~~the~~ sample **at a temperature allowing recovery of the T_2 spectrum of the heavy oil/bitumen, substantially separate from a T_2 water peak;**

(b) means for identifying a distinguishing T_2 cutoff value;

(c) means connected to the relaxometer for measuring total T_2 amplitude below a **the** T_2 cutoff value ~~value~~, wherein a substantial portion of the spectrum attributable to the oil is at T_2 values less than or equal to the T_2 cutoff value; ~~and~~

(d) means for converting the total T_2 amplitude value to a weight value**; and**

(e) means for determining the weight value to determine the oil fraction of the fluid emulsion.

6. (Original) The apparatus of claim 5 wherein the T_2 cutoff value value is about 10 milliseconds.

7. (Original) The apparatus of claim 5 wherein the relaxometer operates at less than about 2 MHz.

8. (Original) The apparatus of claim 7 wherein the relaxometer operates at about 1 MHz.

9. (Original) The apparatus of claim 5 further comprising a heater for heating the emulsion flow.

10. (Currently Amended) An apparatus for determining **by direct measurement** the oil fraction of a fluid emulsion comprising heavy oil/**bitumen** and water comprising:

(a) means for obtaining a sample of the emulsion;

(b) a low field NMR relaxometer ~~for~~ measuring the T_2 spectrum of the sample **at a temperature allowing recovery of the T_2 spectrum of the heavy oil/bitumen, substantially separate from a T_2 water peak**;

(c) means for identifying a distinguishing T_2 cutoff value;

(d) means connected to the NMR relaxometer for measuring total T_2 amplitude below a **the** T_2 cutoff value, wherein a substantial portion of the spectrum attributable to the oil is at T_2 values less than or equal to the T_2 cutoff value;

(e) means for converting the total T_2 amplitude value to a weight value**; and**

(f) means for determining the weight value to determine the oil fraction of the fluid emulsion.

11. (Currently Amended) A method of determining **by direct measurement** the oil fraction and water fraction of a fluid emulsion comprising heavy oil/**bitumen** and water comprising the steps of:

(a) providing a low field NMR relaxometer;

(b) measuring and recording the T_2 relaxation spectrum of the emulsion at a temperature allowing recovery of the T_2 spectrum of the heavy oil/**bitumen substantially separate from a T_2 water peak**;

(c) determining a **distinguishing** T_2 cutoff value;

(d) measuring the total amplitude (A_{oil}) f the spectrum at T_2 times less than and equal to the T_2 cutoff value; ~~(A_{oil});~~

(e) converting A_{oil} to a weight value by dividing A_{oil} by the amplitude index of an oil standard (AI_{oil}) of known weight ~~(AI_{oil})~~;

(f) measuring the total amplitude (A_w) of the spectrum at T_2 times greater than the T_2 cutoff value ~~(A_w); and~~

(g) converting A_w to a weight value by dividing A_w by the amplitude index of a water standard (AI_w) of known weight ~~(AI_w);~~ **and**

(h) **using the oil weight value and the water weight value to determine the oil fraction and water fraction respectively.**

BENNETT JONES

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Application No.:	09/852,339
Filing Date:	May 11, 2001
Inventor (first named):	Mirotchnik
Group Art Unit:	2859
Examiner Name:	FETZNER, Tiffany A.
Attorney Docket No.:	45074.32

Dear Examiner Fetzner,
Further to our telephone conversation of this morning, I enclose proposed amendments to the claims in accordance with our discussions.

I appreciate your careful examination of this case.

Edward Yoo 41435